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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,269	11/26/2003	Toshitaka Nakamura	Q78680	6463

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EXAMINER	
DONG, DALEI	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,269	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12 and 14-17* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 2 and 14-17 are withdrawn in view of the newly discovered reference(s) to U.S. Patent No. 6,831,409 to Yamada. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,831,409 to Yamada.

Regarding to claim 1, Yamada discloses in Figures 6-8, an organic electroluminescence cell comprising: at least one organic layer (13); and a pair of electrodes serving as an anode (12) and a cathode (15); the organic layer including a light-emitting layer (13c) and being sandwiched between the pair of electrodes (12 and 15), at least one of the pair of electrode being provided as a transparent electrode (15), the electroluminescence cell being formed to satisfy the expression (1): $B_0 < B_\theta$ in which B_0

is a frontal luminance value of luminescence radiated from a light extraction surface (discharge plane), and B_θ is a luminance value of the luminescence at an angle of from 50° to 70° (see Figure 8, see column 5, line 66 to column 6, line 13); and a reflection/refraction angle disturbance region (14) being provided substantially without interposition of any air layer so that the angle of reflection/refraction of said luminescence is disturbed while luminescence if output from the light-emitting layer (13c) through the transparent electrode (15) wherein, one of the anode (12) and the cathode (15) is transparent electrode (15) and the other is a reflective electrode (12); and the organic electroluminescence cell satisfies that expression (2): $(0.3/n)\lambda < d < (0.5/n)\lambda$ in which d (nm) is a distance between an approximate center portion of a hole-electron recombination light-emitting region (wherein the thickness of the buffer layer 13a is set to be 50 nm and the thickness of the hole transport layer 13b is set to be 50 nm and the thickness of the light-emitting layer 13c is set to be 50 nm) and the reflective electrodes, λ (nm) is a peak wavelength of a fluorescence spectrum of a material used in the light-emitting layer (wherein the peak wavelength is 535 nm), and n is a refractive index of the organic layer between the light-emitting layer and the reflective electrode (equal to the optical distance (1.9*50 nm + 1.8*50 nm + 1.7*25nm) divided by the real distance (50 nm + 50 nm + 25 nm) which is 1.82).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3-5, 10, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,831,409 to Yamada in view of U.S. Patent No. 6,828,042 to Imanishi of record.

Regarding to claim 3, Yamada discloses in Figures 6-8, an organic electroluminescence cell comprising: at least one organic layer (13); and a pair of electrodes serving as an anode (12) and a cathode (15); the organic layer including a light-emitting layer (13c) and being sandwiched between the pair of electrodes (12 and 15), at least one of the pair of electrode being provided as a transparent electrode (15), the electroluminescence cell being formed to satisfy the expression (1): $B_0 < B_\theta$ in which B_0 is a frontal luminance value of luminescence radiated from a light extraction surface (discharge plane), and B_θ is a luminance value of the luminescence at an angle of from 50° to 70° (see Figure 8, see column 5, line 66 to column 6, line 13); and a reflection/refraction angle disturbance region (14) being provided substantially without interposition of any air layer so that the angle of reflection/refraction of said luminescence is disturbed while luminescence if output from the light-emitting layer (13c) through the transparent electrode (15) wherein, one of the anode (12) and the

cathode (15) is transparent electrode (15) and the other is a reflective electrode (12); and the organic electroluminescence cell satisfies that expression (2): $(0.3/n)\lambda < d < (0.5/n)\lambda$ in which d (nm) is a distance between an approximate center portion of a hole-electron recombination light-emitting region (wherein the thickness of the buffer layer 13a is set to be 50 nm and the thickness of the hole transport layer 13b is set to be 50 nm and the thickness of the light-emitting layer 13c is set to be 50 nm) and the reflective electrodes, λ (nm) is a peak wavelength of a fluorescence spectrum of a material used in the light-emitting layer (wherein the peak wavelength is 535 nm), and n is a refractive index of the organic layer between the light-emitting layer and the reflective electrode (equal to the optical distance (1.9*50 nm + 1.8*50 nm + 1.7*25nm) divided by the real distance (50 nm + 50 nm + 25 nm) which is 1.82).

However, Yamada does not disclose the reflection/refraction angle disturbance region is constituted by a light-diffusing site which contains transparent material, and a transparent or opaque material different in refractive index from the transparent material and dispersed/distributed in the transparent material.

The Imanishi reference teaches in Figure 15(c), an organic electroluminescent cell comprising: the reflection/refraction angle disturbance region (33) is constituted by a light-diffusing site which contains transparent material (transparent resin), and a transparent or opaque material (metal particles) different in refractive index from the transparent material and dispersed/distributed in the transparent material (see column 27, lines 60-65) for the purpose of improving the light-emitting efficiency, discharge efficiency, directivity and anisotropy.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the reflection/refraction angle disturbance region of Imanishi for the organic electroluminescent cell of Yamada in order to improve the light-emitting efficiency, discharge efficiency, directivity and anisotropy.

Regarding to claim 4, Imanishi teaches in Figure 15(b), the reflection/refraction angle disturbance region (32) is constituted by a lens structure (see column 27, lines 47-59) and the motivation to combine is the same as above.

Regarding to claim 5, Imanishi teaches discloses in Figure 15(a), the reflection/refraction angle disturbance region (30) is constituted by a protruded and grooved face (see column 27, lines 33-46) and the motivation to combine is the same as above.

Regarding to claim 10, Imanishi teaches discloses in Figure 15(c), the reflection/refraction angle disturbance region (33) is constituted by a polarizing/scattering site which contains a light-transmissive resin, and micro domains (metallic fine particles) different in birefringence characteristics from the light-transmissive resin and dispersed/distributed in the light-transmissive resin (see column 27, line 59 to column 28, line 2) and the motivation to combine is the same as above.

Regarding to claim 14, Yamada in view of Imanishi discloses a planar light source having an organic electroluminescent cell defined in any one of the claims 1, 3, 4 and 5.

Regarding to claim 16, Yamada in view of Imanishi discloses a display device having a planar light source defined in claim 14.

6. Claims 6-9, 11, 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,831,409 to Yamada in view of U.S. Patent No. 6,828,042 to Imanishi of record and in further view of U.S. Patent No. 6,507,379 to Yokoyama of record.

Regarding to claim 6, Yamada in view of Imanishi discloses an organic electroluminescence cell comprising: at least one organic layer (13); and a pair of electrodes serving as an anode (12) and a cathode (15); the organic layer including a light-emitting layer (13c) and being sandwiched between the pair of electrodes (12 and 15), at least one of the pair of electrode being provided as a transparent electrode (15), the electroluminescence cell being formed to satisfy the expression (1): $B_0 < B_\theta$ in which B_0 is a frontal luminance value of luminescence radiated from a light extraction surface (discharge plane), and B_θ is a luminance value of the luminescence at an angle of from 50° to 70° (see Figure 8, see column 5, line 66 to column 6, line 13); and a reflection/refraction angle disturbance region (14) being provided substantially without

interposition of any air layer so that the angle of reflection/refraction of said luminescence is disturbed while luminescence if output from the light-emitting layer (13c) through the transparent electrode (15) wherein, one of the anode (12) and the cathode (15) is transparent electrode (15) and the other is a reflective electrode (12); and the organic electroluminescence cell satisfies that expression (2): $(0.3/n)\lambda < d < (0.5/n)\lambda$ in which d (nm) is a distance between an approximate center portion of a hole-electron recombination light-emitting region (wherein the thickness of the buffer layer 13a is set to be 50 nm and the thickness of the hole transport layer 13b is set to be 50 nm and the thickness of the light-emitting layer 13c is set to be 50 nm) and the reflective electrodes, λ (nm) is a peak wavelength of a fluorescence spectrum of a material used in the light-emitting layer (wherein the peak wavelength is 535 nm), and n is a refractive index of the organic layer between the light-emitting layer and the reflective electrode (equal to the optical distance (1.9*50 nm + 1.8*50 nm + 1.7*25nm) divided by the real distance (50 nm + 50 nm + 25 nm) which is 1.82); and the reflection/refraction angle disturbance region is constituted by a light-diffusing site which contains transparent material, and a transparent or opaque material different in refractive index from the transparent material and dispersed/distributed in the transparent material.

However, Yamada and Imanishi does not disclose a reflection type polarizing element provided on a light emission side viewed from the reflection/refraction angle disturbance region.

The Yokoyama reference teaches in Figure 5, an organic electroluminescent cell comprising: a reflection type polarizing element (13) provided on a light emission side

viewed from the reflection/refraction angle disturbance region for the purpose of achieving a brighter image by preventing the diminution in the amount of light produced by divergence of the light and providing a resonator structure whereby light of good optical emission directionality is emitted.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized the reflection type polarizing element of Yokoyama and the reflection/refraction angle disturbance region of Imanishi for the organic electroluminescent cell of Yamada in order to achieve a brighter image by preventing the diminution in the amount of light produced by divergence of the light and provide a resonator structure whereby light of good optical emission directionality is emitted.

Regarding to claim 7, Yokoyama teaches in Figure 5, the reflection type polarizing element is a reflection type circular polarizing element made of a cholesteric liquid crystal layer (132 see column 14, lines 30-42) and the motivation to combine is the same as above.

Regarding to claim 8, Yokoyama teaches in Figure 5, the reflection type polarizing element is a reflection type linear polarizing element made of multilayer laminate of at least two material (132 and 131) different in refractive index and the motivation to combine is the same as above.

Regarding to claim 9, Yokoyama teaches in Figure 5, an optically compensating layer (131) which has no anisotropy in in-plane refractive index and in which a refractive index in a direction of thickness is higher than the in-plane refractive index (see column 14, lines 43-58) and the motivation to combine is the same as above.

Regarding to claim 11, Yokoyama teaches in Figure 5, the polarizing/scattering site (132) contains micro domains made of liquid crystal material (see column 14, lines 30-42) and the motivation to combine is the same as above.

Regarding to claim 12, Yokoyama teaches in Figure 5, the polarizing/scattering site contains a light-transmissive resin, and micro domains which are made of a liquid crystal polymer having a glass transition temperature of not lower than 50° C to exhibit a nematic liquid crystal phase at a lower temperature than the glass transistion temperature of the light-transmissive resin and which are dispersed in the light-transmissive resin (see column 14, lines 30-42) and the motivation to combine is the same as above.

Regarding to claim 15, Yamada in view of Imanishi and in further view of Yokoyama discloses a polarizing-type planar light source having an organic electroluminescent cell defined in any one of the claims 6 to 13.

Regarding to claim 17, Yamada in view of Imanishi and in further view of Yokoyama discloses a display device having a polarizing-type planar light source defined in claim 15.

Allowable Subject Matter

7. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding to claim 13, prior art of record taken alone or in combination fails to teach or suggest an organic electroluminescent cell comprising: the polarizing/scattering site exhibits refractive index difference Δn_1, Δn_2 and Δn_3, between the micro domains and the other portions in directions of respective optical axes of the micro domains; and the refractive index difference Δn_1, in an axial direction (Δn_1 direction) as the highest one of the refractive index difference Δn_1, Δn_2, and Δn_3, is in a range of from 0.03 to 0.5 whereas each of the refractive index differences Δn_2 and Δn_3 in two axial directions (Δn_2 direction and Δn_3 direction) perpendicular to the Δn_1 direction is not larger than 0.03.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of an electroluminescent display device.

U.S. Patent Application Publication No. 2003/0122481 to Song.

U.S. Patent Application Publication No.2004/0012980 to Sugiura.

U.S. Patent Application Publication No. 2004/0145303 to Yamada.

U.S. Patent Application Publication No. 2004/0212296 to Nakamura.

U.S. Patent Application Publication No. 2004/0263045 to Smith.

U.S. Patent Application Publication No. 2005/0099113 to Yamada.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.
June 2, 2005

Joseph Williams
Primary Examiner
Art Unit 2879